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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,729	10/23/2003	Charles D. Jaquays	1014	7684

7590 12/20/2005

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EXAMINER	
MARCANTONI, PAUL D	
ART UNIT	**PAPER NUMBER**
1755	

DATE MAILED: 12/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/690,729	JAQUAYS, CHARLES D.	
	Examiner	Art Unit	
	Paul Marcantoni	1755	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *29-44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *29-44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 29-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jaques et al. '352, Iwu '567, GB 1474056, GB 1484671 (Gnyra et al.), or JP 55092200 (see also English abstract of this reference) alone or in view of Rusinov '208, Nakagawa et al. '561, Helgesson '086, or Arfaei et al. '751.

Jaques et al. '352 teach mixing a silica rich ore including the waste product (col.3, line 64), which thus includes bauxite waste, by mixing with sulfuric acid. It is the examiner's position that Jaques et al. teach digesting when he mixes a silica containing ore (e.g. bauxite waste) with a strong acid (e.g. sulfuric acid) in an aqueous slurry to produce an insoluble acid product. This digestion process would have been understood to neutralize the bauxite waste tailings to the range claimed by applicants. Note that "about" 5.5 to 6 can potentially be inclusive of even a pH of 7. Applicants do not specify what range is "about" 5.5 or "about" 6.0 for pH. The produced bauxite or silica product is then washed and later dewatered and can be ground for use as a pozzolan, a raw material for building materials or construction materials.

Iwu '567 teaches treatment of bauxite red mud which means the same as bauxite tailings as a waste material. Iwu '567 teaches mixing bauxite tailings or bauxite red mud with hydrochloric acid. It is the examiner's position that the use of a specific strong mineral acid would have been an obvious design choice for one of ordinary skill in the

art to use a functionally equivalent strong acid such as sulfuric acid or hydrochloric acid because both effectively neutralize the bauxite mine tailings (or red mud) which is required to make it later useful for a construction material such as a construction brick. While Iwu does not teach the presence of sodium sulfate because HCl is used as the strong mineral acid, Iwu still does not teach away from the claimed invention. The applicants state that the residual sodium sulfate acts as a catalyst. It is not exactly clear what applicants mean by catalyst (accelerator?) but it is notoriously known in the art that both sodium sulfate (the residual salt from reaction of bauxite tailings and sulfuric acid) and sodium chloride (the residual salt from reaction of bauxite tailings and hydrochloric acid) are accelerators for cement. It would have been an obvious design choice for one of ordinary skill in the art to form either of these two residual salts also known as a accelerators which do have a "catalytic" effect. An accelerator can be considered a catalyst though it is not understood what applicants mean by "catalyst" in relation to the cement matrix. They are invited to clearly explain if what they mean by "catalyst" is an accelerator or possibly something else.

GB 1474056 (The University of Guyana) teach that red mud or bauxite tailings may be treated with either sulphuric acid or hydrochloric acid solution (page 1, col.1, lines 35-36). GB '056 teaches that the hydrochloric acid (and thus or sulphuric acid) is added in amounts to attain a pH of 5.5 to 6, then separates the solids from liquid phase and even teaches that solid sodium chloride salt ***can*** be recycled or recovered by evaporating the brine (page 1, col.2, second paragraph, lines 55-64). It is important to note that the sodium chloride salt for HCl or sodium sulfate salt for sulphuric acid can

still be residually present in the acid treated bauxite (red mud) tailing slurry and thus still have a catalytic affect if later added to a cementitous matrix.

GB 1484671 (Gnyra et al.) teach treating bauxite red mud or bauxite tailings with sulfuric acid (note that either spelling suffices because sulphuric is the British spelling) and optionally hydrochloric acid to neutralize the slurry (see claim 1). GB '671 further teaches that the final pH after acid treatment of the bauxite red mud or bauxite tailings has pH values including 6.6 to 7.3. It is the examiner's position that at least 6.6, 6.7, 6.8, and 6.9 for pH is "about 6" for the purposes of applicants' claimed invention. It is also noted that the last step of "separating aqueous sodium sulfate solution and having a catalytic residual amount of sodium sulfate" is also satisfied by the teachings of the reference because they heat or dry the mixture of sulfuric acid and bauxite red mud (tailings) at 105 C (see p.2, lines 48-55). Heating will remove the aqueous solution and simply leave the residual sodium sulfate salt which can have a catalytic effect if later used in cement.

JP 55092200 teach neutralization of red mud with sulfuric acid at pH ranges from 7-10 for the first stage, 6.5 for the second stage, and 5.5 for the third stage and that this acid treated bauxite red mud or bauxite mine tailings can later be used as a road construction material. Road construction materials can be cementitious and most often are cementitious. Concrete is an example of a road material that is cementitious. It is the examiner's position that the solution would have to be removed from the treated bauxite tailing red mud waste before making a road material and there would be residual sodium sulfate in the material and thus have a catalytic effect if added to a road

construction material such as concrete or possibly other road construction material that are pozzolanic and/or hydraulic such as fly ash.

Rusinov teaches the presence of sodium sulfate is beneficial and even improves strength and acts as a plasticizer for concrete or cement mixes (col.3, paragraph 2). Helgesson '086 also teaches an improved strength concrete by using sodium sulfate and that it increases the ion activity in the water phase which initially delays hydration of tricalcium aluminate cement component but later accelerates the reaction (col.1, lines 50-65). Nakagawa et al. '561 teaches the use of sodium sulfate as a quick hardener or accelerator (and thus a catalyst) is old in the cement art. Arfaei et al. '751 teaches that sodium chloride (NaCl) is a well known accelerator (and thus a catalyst) for cement (col.1, lines 32-34). It is the examiner's position that the presence of this component in any of the cementitious products of claim 1 would have a catalytic and beneficial effect on the properties of the final cementitious products for parameters such as strength.

Objection to Specification:

The last two lines on page 5 and the first paragraph (lines 1-5) of page 6 of applicants' specification are not understood and vague. The applicants state that if sodium sulfate is not completely separated from the sulfuric acid treated bauxite tailings or red mud, the residual sodium sulfate salt would act as "a catalyst for the formation of the carbonaceous crystals that characterize the internal crystalline structure of cementious matrixes". It is not clear where there is carbon or carbonaceous material that form crystals or an internal crystalline structure in cement matrixes. This is the point not understood. It is further noted that applicants corrected the term "carbonatious" to –

carbonaceous--- in their 12/6/05 amendment to the specification. It may well be that applicants possibly meant "carbonate" (ie from calcium carbonate or lime) to form a crystal structure but carbon crystals in cement is not understood.

35 USC 112 Second Paragraph:

Claims 29-44 are rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention.

Claim 29 would appear indefinite because applicants do not particularly point out and distinctly claim how they separate aqueous sodium sulfate solution from the remaining insoluble slurry without washing said slurry. How is it done? Is it heated to remove the solution? What do applicants specifically do to separate them?

The term "catalytically effective amount of sodium sulfate" is indefinite in the claims. What amount is catalytically effective? .0001 wt?, 1 wt%, 10 wt%? This is not clear. It is the examiner's position that the presence of even a trace or minute quantity not removed can read upon a "catalytically effective amount".

The applicants should note that the term "generally" with respect to "generally homogeneous powder" would appear indefinite and allows for possibly some inhomogeneity and a broader reading of this term. Also "generally pass" for the powder description in the claim allows that some material will not pass. "Generally free flowing slurry" means that it does not have to be fully free flowing. While generally and other similar words are sometimes construed liberally to avoid unduly restricting a patent claim, the imprecision of such a term cannot be allowed to negate the meaning of the words it modifies-thus "generally planar" in claim was intended to allow for irregular

deviations from perfectly flat surface and not to broaden planr to encompass distinctliy arcuate surfaces. Arvin Industries v Berns Air King Corp, 525 F 2d 182, 188 USPQ 49, (CCA 7-1975). Applicants have not defined specifically what characterizes a generally homogeneous powder (as opposed to simply a homogenous powder), the meaning of "generally pass" (what percentage of particles do you mean by that pass the 16 mesh screen and how is this different than simply "passing through a 16 mesh screen", and how is applicants "generally free flowing slurry" different than simply a "free flowing slurry". Please specifically define the differences with all these terms above.

Claim 37 is indefinite because carbonaceous crystals do not form in cement. It is possible that carbonate crystals form in cement but carbonaceous is not understood.

It is noted that the cement in claims 39-41 is not defined as a "hydraulic" cement so it could simply read upon a binding substance such as a clay or polymer.

The term "predetermined" is indefinite in claim 42.

Claim 44 is vague. The term "obtainable" would seem to suggest this is not the only method that can be used to make the product and would not appear to be a proper product by process claim. The use of the term –obtained—is more definite and limits the possibility of other methods to make the product absent evidence to the contrary.

Response:

As stated above, the formation of carbonaceous crystals that characterize the inernal crystalline structures of cement is not understood. It is not clear if applicants meant carbonate crystals (ie calcium carbonate or limestone) which is a raw material in

cement manufacture. There is not carbon crystals forming in hydraulic cement but carbonate crystals it may occur.

The applicants state that they wash away their slurry four ~~teims~~ times. Yet applicants have not defined what they mean by "catalytic amount" of sodium sulfate so the amounts can potentially be a microscopic or miniscule amount that is residually present and still function as a catalyst.

The applicants argue Iwu because he teaches only hydrochloric acid and not sulfuric acid which is required to obtain the catalyst sodium sulfate. In rebuttal, as stated above, sodium chloride, the residual salt from reacting bauxite red mud (tailings) and hydrochloric acid, is also a catalyst and functions as known accelerator in cement. An accelerator is a catalyst to the curing reaction in cement. It is also an obvious design choice for one of ordinary skill in the art to use a particular strong mineral acid to neutralize the bauxite red mud tailings to allow for a viable construction brick or product. The applicants are referred to the British patents above which show the use of hydrochloric acid or sulfuric acid to neutralize bauxite red mud tailings would have been an obvious design choice for one of ordinary skill in the art because both are known strong mineral acids.

The applicants argue that Jaques et al. digests silica ore (ie bauxite waste such as red mud or tailings) without mentioning pH. One of ordinary skill in the art would have understood the term "digestion" as encompassing the treatment for neutralization of the bauxite waste tailings (red mud) and leading to a pH in their claimed range.

The applicants argue that they pulverize (or comminute) the bauxite red mud tailings into a powder sufficient to pass through a 16 mesh screen versus Jaques that do not do so. Yet, applicants argue limitaitions not present in all of their claims. Claim 29 does not contain the limitation that the pulverized bauxite tailing powder passes (or generally passes, what that means as different than passes is not clear) through a 16 mesh screen. Further, Jaques et al. do teach that the shape, fineness, and particle size distribution do influence the overall properties of cement or concrete and control of particle size and fineness would thus have been an obvious design choice for one of ordinary skill in the art. Further Jaques et al. explicitly teach the silica waste product (ie bauxite waste tailings) can be ground (col.3, line 65) thus meeting the claim limitations. Applicants have not shown that grinding to a 16 mesh fineness is critical or leads to an unexpected result over Jaques either.

The applicants also seem to argue that Jaques et al. do not teach agitating the powder and adding water to form a slurry. In rebuttal, agitating can result by simply mixing the water with the bauxite ore. It is understood that the two components are mixed and agitating is mixing.

The examiner has fully explained his rejections and fully responded to the applicant's arguments as shown above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul Marcantoni whose telephone number is 571-272-1373. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Paul Marcantoni
Primary Examiner
Art Unit 1755